Ecological Niche Modelling Improvised to Predict Potential Habitats of Threatened Tree Species for Effective Management

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ABSTRACT

Prediction of potential habitats of a species is essential and the most challenging aspect in species conservation and management. This has become very crucial in the paradigm of ecosystem restoration or ecorestoration of habitats of threatened species. Precise prediction can exclude the possibility of interference to the niche of other species along with increased efficiency in ecorestoration practice. The traditional methods of defining habitat of a species are restricted to the vegetation type, elevation, rainfall or a combination of these. The concept of bioclimate has brought a new dimension and the WorldClim bioclimatic data-based ecological niche modelling provides interactive Ecological Niche Modelling (ENM) for prediction of habitat suitability. The present study used an improvised methodology, a combination of Maxent based niche modelling and QGIS based terrain mapping to cover some of the limitations of ENM for the prediction of potential habitat. It is tested here with prediction of potential habitats for two red listed tree species Prioria pinnata (Roxb. ex DC.) Breteler and Cryptocarya anamalayana Gamble endemic to Western Ghats.

The former has numerous records of occurrence throughout the Western Ghats and the latter has very restricted distribution. The results were compared both for normal ENM and for the improvised method and also with the ground level knowledge in the predicted locations. The predictions based only on ENM have provided potential distribution sites including areas which lack terrain suitability. The combined methodology provided a high degree of precision to the predictions. The procedure adopted for the modelling is provided in detail.

Keywords: IUCN Red List; Ecosystem management; Western Ghats; Ecorestoration; Niche profiling